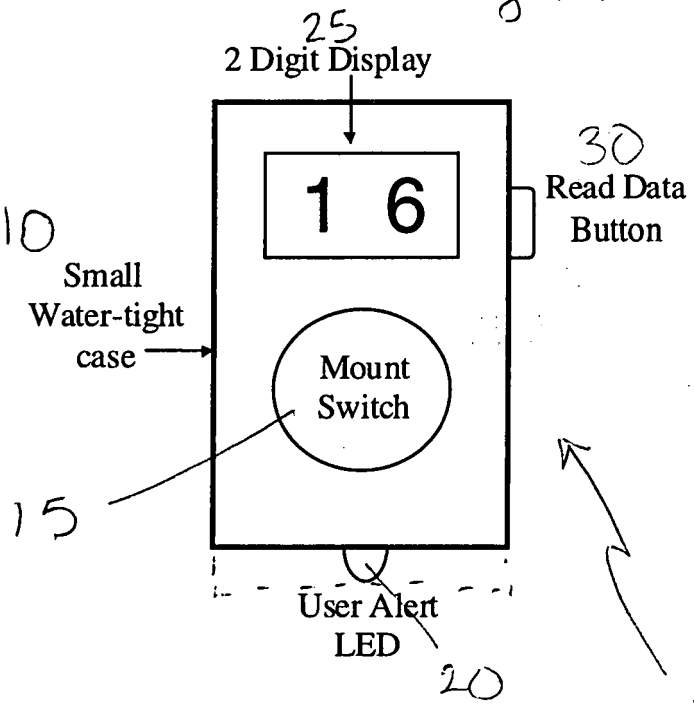
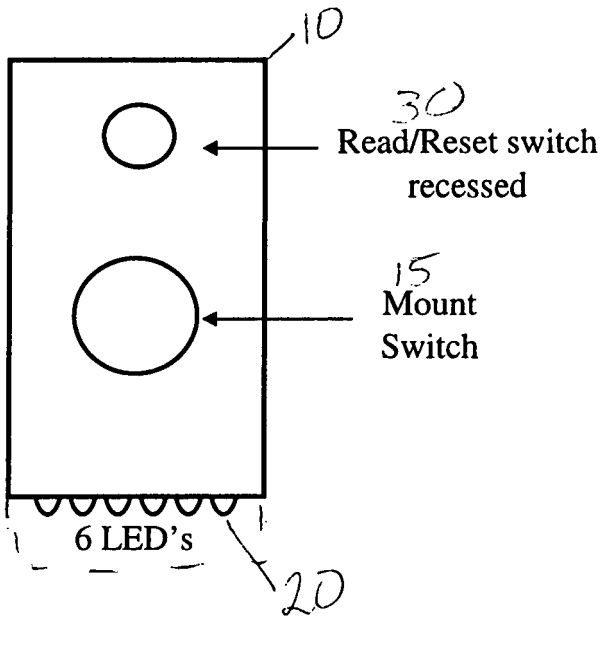
Mount Count Design

- Two versions are currently being considered
  - 2-digit display version
  - Estimated Parts Costs (1000's):
    - $9



Row of LED's version

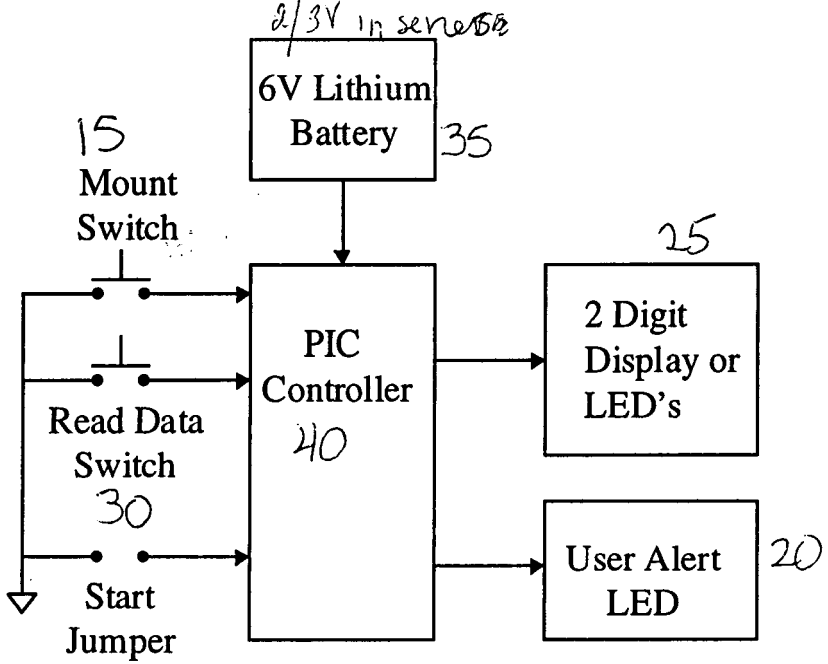
$7



Mount Count Block Diagram

- Simple, low parts count design provides:
  - Low cost to manufacture
  - Reliability

Fig 3



Patent Considerations:

The patent issued in January, 1987 (Patent Number 4,635,587) is titled "Method and apparatus for detecting standing heat in cattle." The pertinent claim in this patent is as follows, with the critical parts bolded.

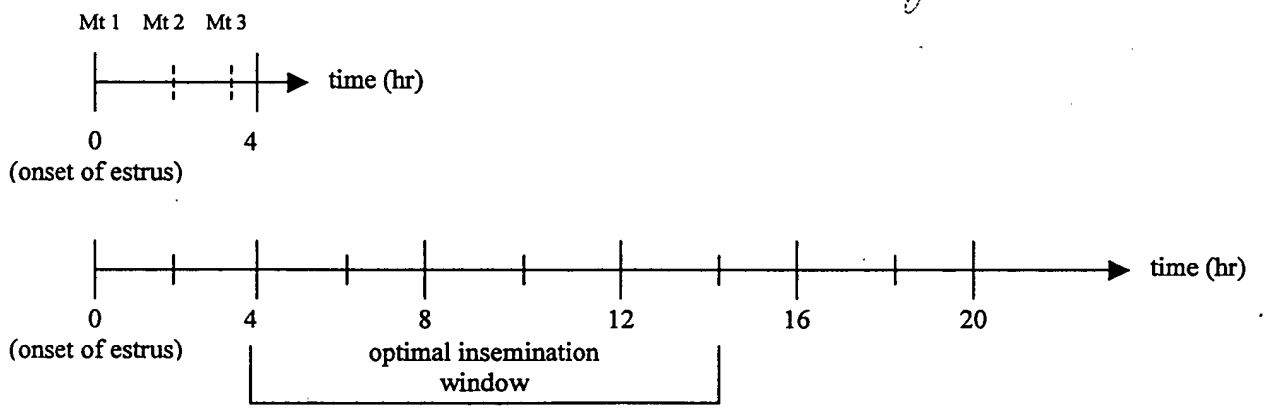
"A self-contained apparatus for detecting the onset of estrus in cattle, including:

> a pressure responsive **switch** disposed to be **actuated by mounting of the cow, timer** means connected directly to said switch means **for activation** thereby **in count up fashion, digital readout** means connected to said timer means and disposed **to display the elapsed time after mounting of the cow, audible and visible signaling** means connected directly to said timer means **to emit a warning signal in response to activation of** said **timer** means, **means for securing** said pressure responsive switch, said time means, said readout means, and said signaling means together in closely adjacent fashion **to the base of the tail of a cow**; said means for securing including means for **displaying** said **elapsed time directly from the apparatus secured to the cow,** and said means for securing further including means for **emitting said audible and visible warning signals directly from the apparatus secured to the cow.**"

My interpretation of this patent leaves several areas in which the proposed design is not covered.

1. The proposed timing is from **determination** of estrus, not the **onset** of estrus. For example, the patent does not teach about algorithms to determine the actual estrus event, but simply teaches that the first mount indicates the initiation of mounting and starts the timer. With Dr. Nebel's research results in insemination timing, the optimal breeding window is 4-14 hours after onset of estrus. With an algorithm of 3 mounts in 4 hours to determine estrus, this optimal window will not be jeopardized (see Figure 3).

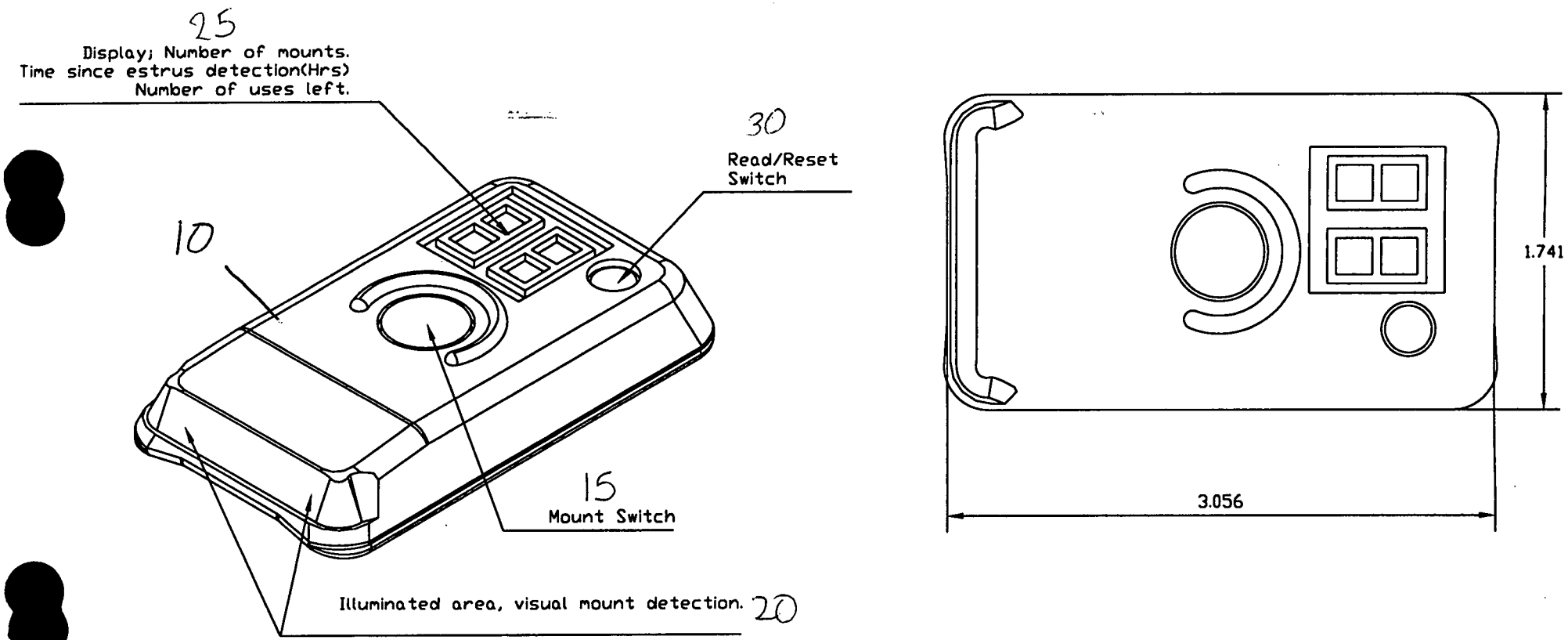
Figure 3. Estrus determination algorithm and optimal insemination timing. Fig 4



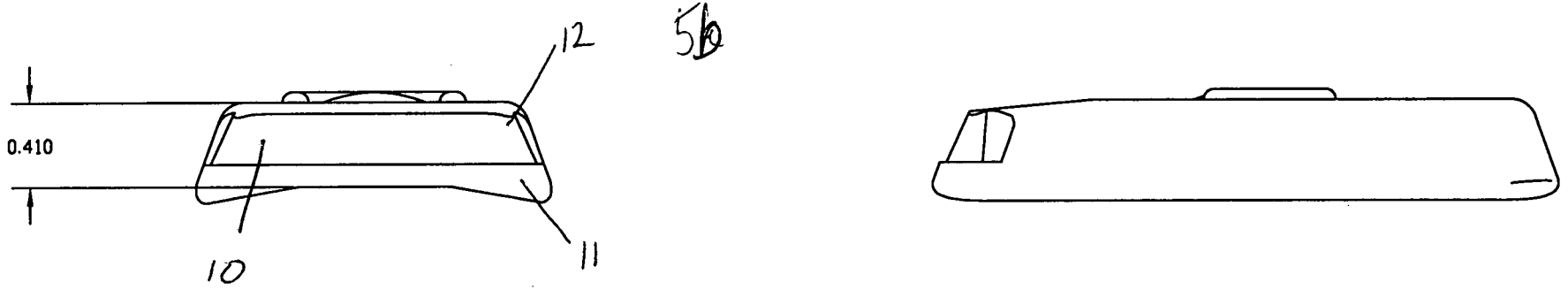
In one extreme case, the 3rd mount in 4 hrs would occur exactly on the 4th hour, i.e., 4 hours following onset. Therefore, the mount counter would indicate the determination of estrus 4 hours after the actual onset. The optimal insemination window would simply change from 4-14 hours following **onset** to 8-18 hours following **determination.** In the other extreme, the 3rd mount in 4 hrs would occur almost immediately after the 1st and 2nd mounts, making the **determination** of estrus almost coincide with the **onset.** Therefore, the optimal insemination window would remain at 4-14 hours following determination. Using the union of these extremes, the optimal window for insemination using "determination" would be 8-14 hrs.

2. The proposed algorithm for determining estrus would be x mounts in y hours, thus providing a means for elimination of false, non-estrus related mounts.
3. The proposed design would not only display the time from the determination of estrus, but also the accumulated number of mounts.

Fig. 5a

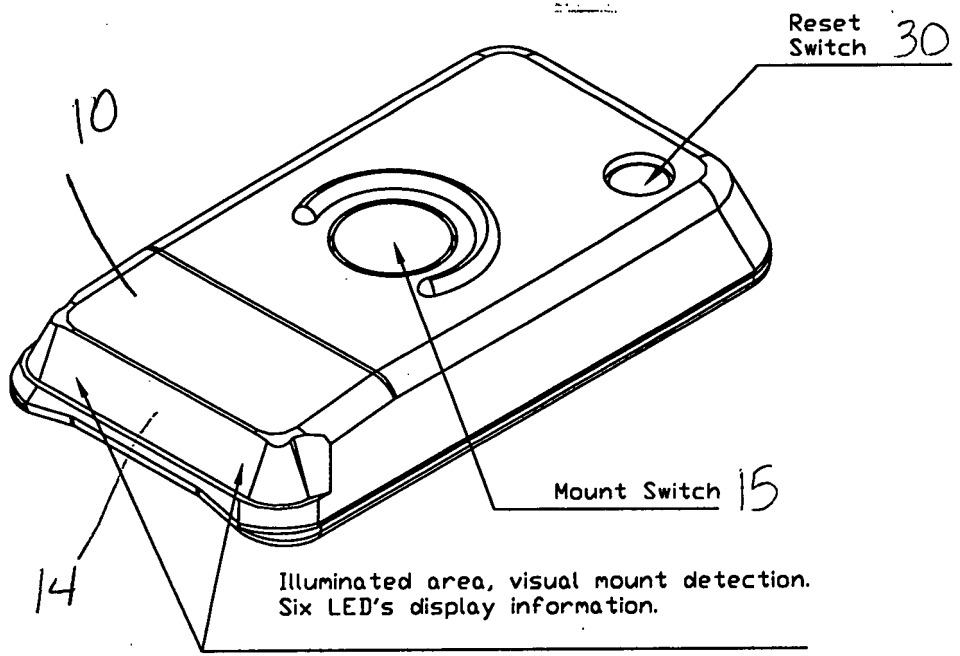


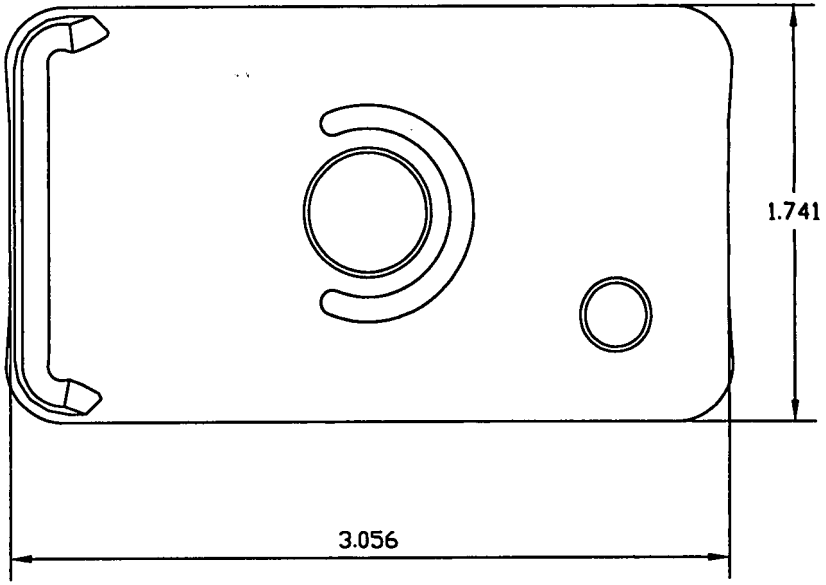
5b

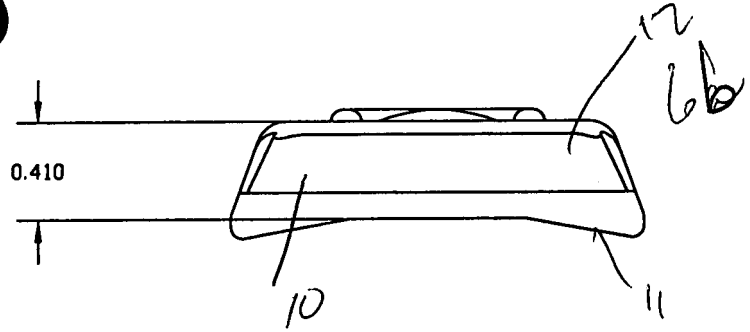


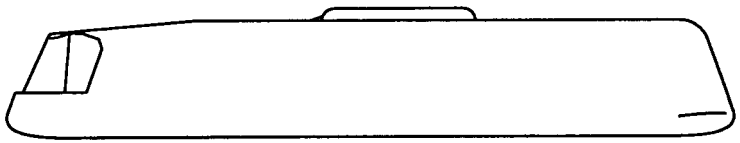
Mount Count with Display

Fig 6a



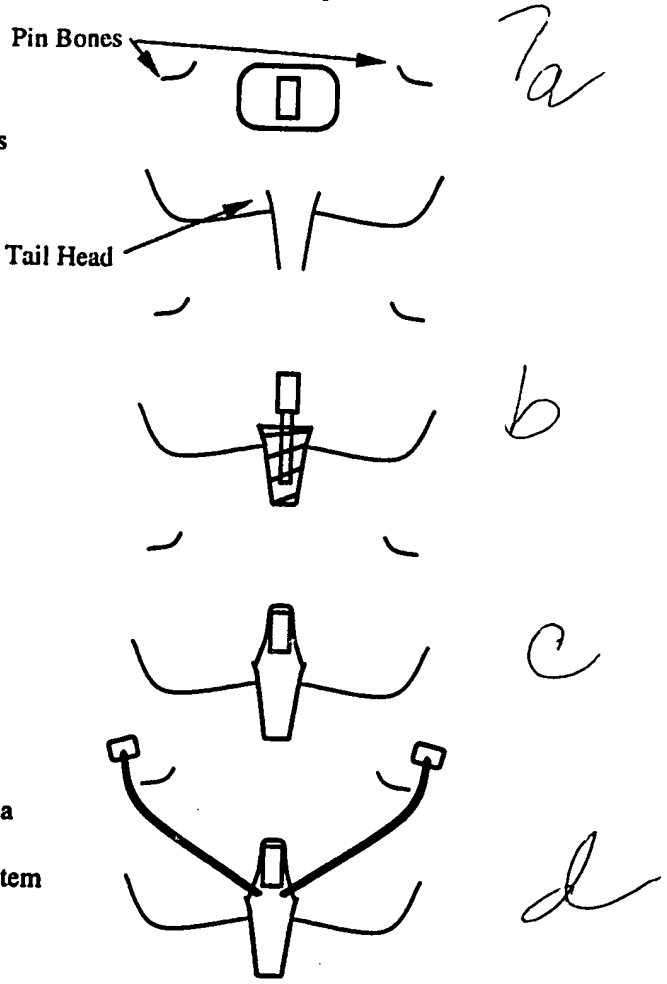






Mount Count w/o Display
Six Information LED's

Sketch of Top View



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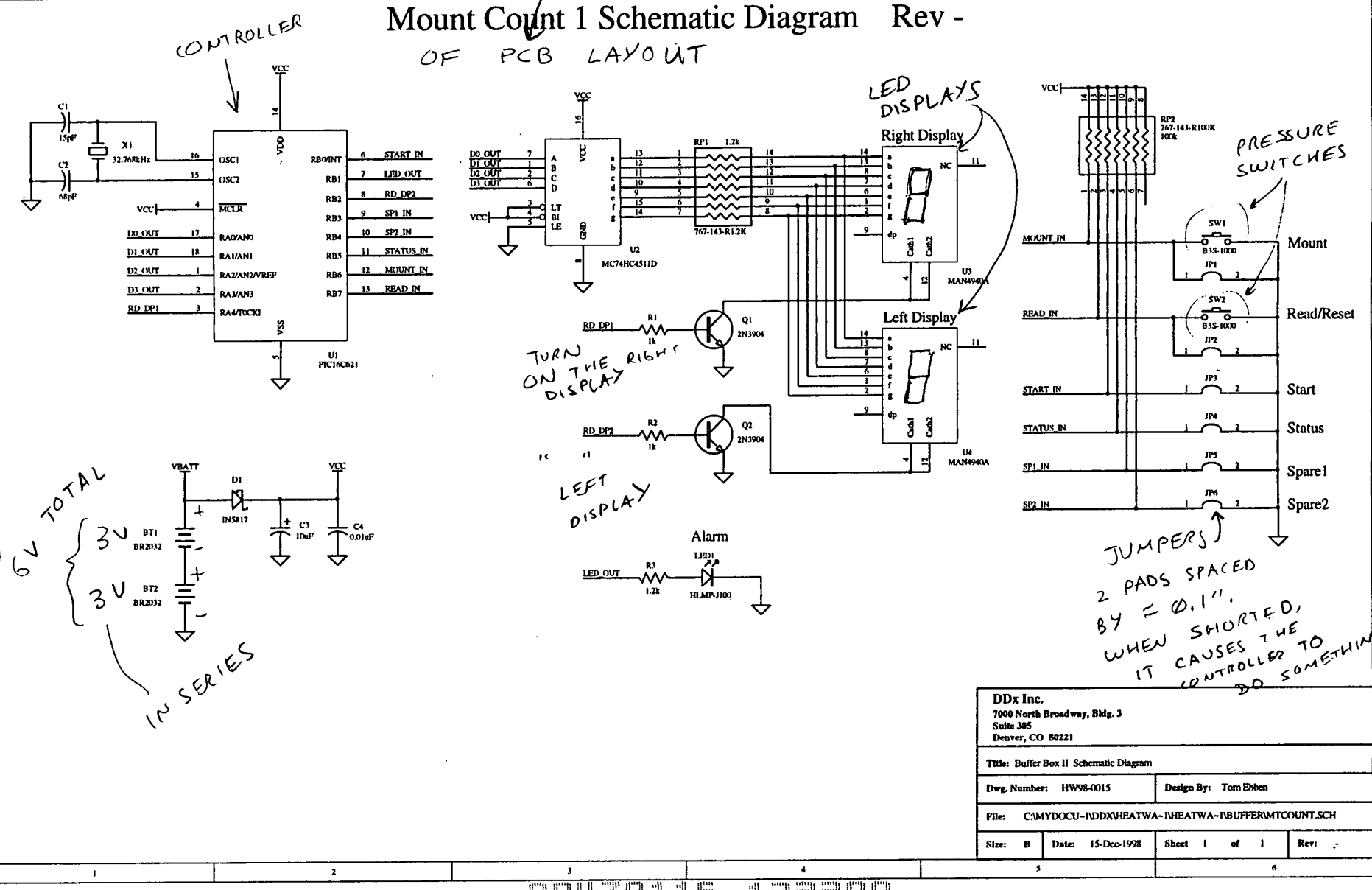
ons
; system

Fig 8

PRINTED CIRCUIT BOARD

Mount Count 1 Schematic Diagram Rev -

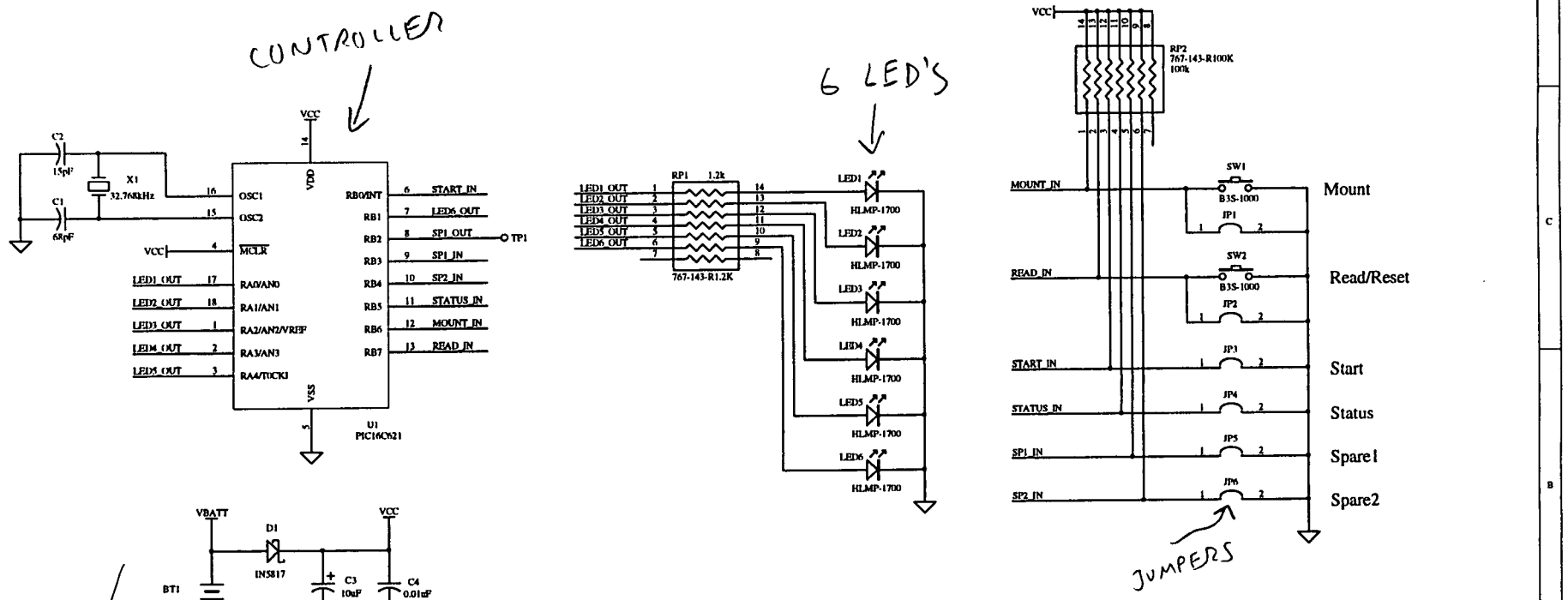


DDx Inc. 7000 North Broadway, Bldg. 3 Suite 305 Denver, CO 80221			
Title: Buffer Box II Schematic Diagram			
Dwg. Number: HW98-0015		Design By: Tom Ebben	
File: C:\MYDOCU~1\DDX\HEATWA~1\HEATWA~1\BUFFER\MTCOUNT.SCH			
Size: B	Date: 15-Dec-1998	Sheet 1 of 1	Rev: -

FIG 9

Mount Count 2 Schematic Diagram Rev -

FOR THE PCB



DDx Inc. 7000 North Broadway, Bldg. 3 Suite 305 Denver, CO 80221			
Title: Buffer Box II Schematic Diagram			
Dwg. Number: HW98-0015		Design By: Tom Ehben	
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Size: B	Date: 15-Dec-1998	Sheet 1 of 1	Rev: -

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MountCount™ Description and Operating Instructions

Author: Tom Ebben

Date: 7-28-99

The MountCount™ Unit by DDx, Inc.

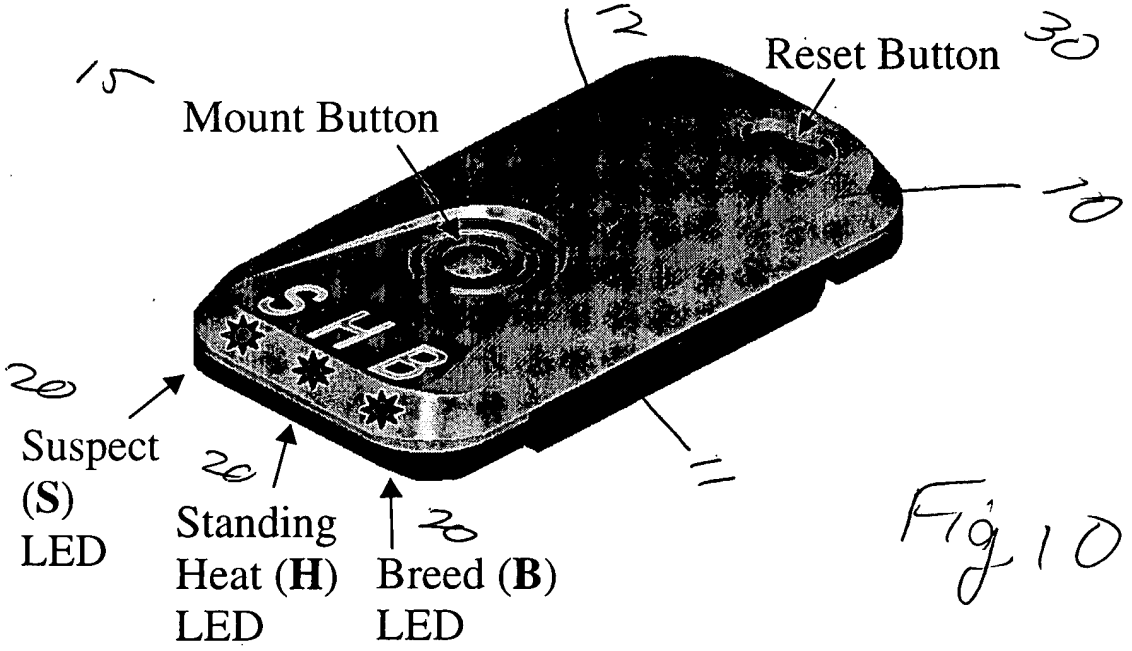
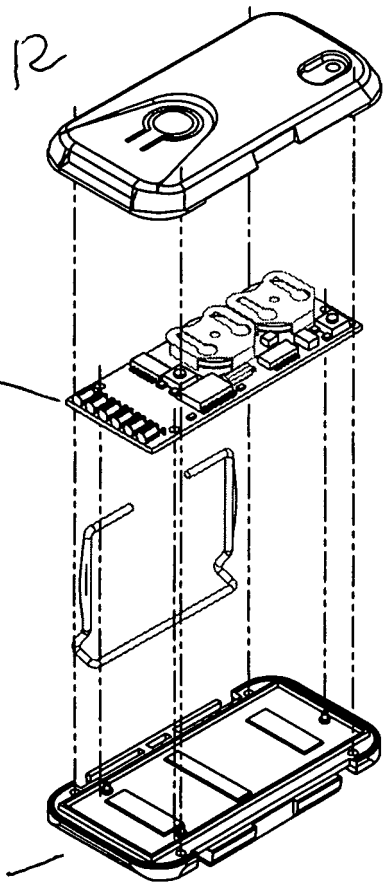


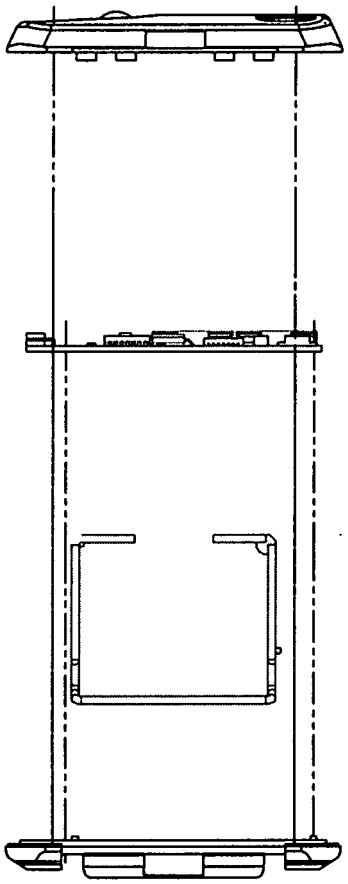
Figure 1. MountCount™ Unit top view

The MountCount™ Unit (MCU) shown in Figure 1 is an electronic device for the purpose of detecting estrus in the bovine species. It provides the user with visual indicators of when the animal is in heat, which substantially improves the chances of successfully breeding the animal. Standing heat in cattle has proven to be one of the most reliable means of determining the onset of the estrus cycle, which accurately predicts when ovulation occurs. Standing heat is defined by standing mounting activity where one animal mounts the tailhead of the animal in heat. The mounting activity is characterized by a substantial and consistent amount of pressure placed on the tailhead for short periods (seconds) of time. The MCU consists of a battery-powered electronic circuit board housed in a watertight case, which is attached to the tailhead of the animal in heat. The mounting activity is detected by a button, which is carefully designed to activate an electronic switch located on the circuit board. A sophisticated microprocessor senses the switch closure every time there is a mount, and performs mathematical computations to determine the state of the estrus cycle. The microprocessor then alerts the user of the estrus state by flashing high-intensity light emitting diodes (LED's) visible through the end of the case. In short, the MCU was designed to make the job of the breeder very easy – they simply need to observe when the Breed LED is flashing to know when to breed the animal.

Fig. 11

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A2	INITIAL RELEASE	11-JUN-9[illegible]	G. WAGNER





ITEM	QTY ASSD	FSCM NO.	PART OR IDENTIFICATION NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: RMS 32 DECIMALS XXX ± 0.02 XXXX ± 0.005 ANGLES ± 0.5°	CONTRACT NO.		
	APPROVALS	DATE	ASSEMBLY, MOUNT COUNT
MATERIAL	DRAWN G. WAGNER		
FINISH	CHECKED		SIZE FSCM NO. DWG. NO. MOUNT COUNT ASSY REV. A2
	ISSUED		
	ENGINEER		SCALE 1=1 SHEET

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